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JAMES S. DUNBAR
S. DAVID WEBB
MICHAEL FAUGHT
RICHARD J. ANUSKIEWICZ
MELANIE J. STRIGHT

Archaeological Sites in the Drowned Tertiary Karst Region of the Eastern Gulf of Mexico

Introduction

Transgressing seas over the continental shelf have effectively concealed evidence of past terrestrial environments that existed during the last ice age. Similarly, prehistoric archaeological sites inundated by the sea are the most elusive cultural resource to recognize, much less locate. Sites may be deeply buried and inaccessible in some regions of the continental shelf and shallow but difficult to identify in others.

In the eastern Gulf of Mexico, the majority of inundated sites (Stright 1987, 1989 - for summary) have been discovered on the Tertiary limestone shelf, an offshore area of karstified limestone with little sediment cover. The areas where Tertiary limestones occur near or at the ground's surface (on and offshore) will be referred to as the Tertiary Karst Region. Within the interior of Florida, Paleoindian sites located in both underwater and terrestrial locations are numerous. However, not many sites have been discovered offshore because little field work has been attempted and marine growth and weathering have tended to conceal site locations. Chemical deposition or solution of artifacts caused by sea water and marine organisms and the marine environment (wave or current action) are primary causal factors.

The Tertiary Karst Region of the Gulf Coast, extends from Tampa to Apalachee Bay along the Gulf of Mexico. The Tertiary Karst Region is an important archaeological area because Paleoindian sites are densely clustered and comprise one of the major site concentrations in the Eastern United States (Science Applications Inc. 1979; AENA 1982).

During the late Pleistocene and the Early Holocene, many of Florida's inland rivers, lakes and other surface water features were dry except for a few, mostly lowland, water holes that became the focus of Paleoindian activity. An amazing 90% of the Paleoindian sites containing the diagnostic artifacts Clovis, Suwannee, or Simpson projectile points and carved proboscidean ivory foreshafts are located near karst depressions that penetrate the Tertiary limestones to expose the Floridan aquifer as a source of potable water. In Florida, the distribution of Clovis/Suwannee sites indicates settlement and activity areas were centered where natural resources, particularly drinking water and, to a lesser extent, lithic material for tool production were most abundant (Dunbar 1989).

Expressed as a hypothesis, the river basins in the (two) Tertiary Karst Regions of Florida have the greatest concentration of Clovis/Suwannee Paleoindian sites because unique environmental conditions created natural resource accumulations that complemented technology and subsistence behavior. Stable habitats in the karst regions supported grazing animals but dry intervals confined game herds to oasis locales. During droughts, oases in the karst river and lake bottoms offered water, food, bone, and lithic resources for Paleoindian exploitation. As a result, major site clusters in Florida became centered around rivers like the Santa Fe and Aucilla because multiple resources

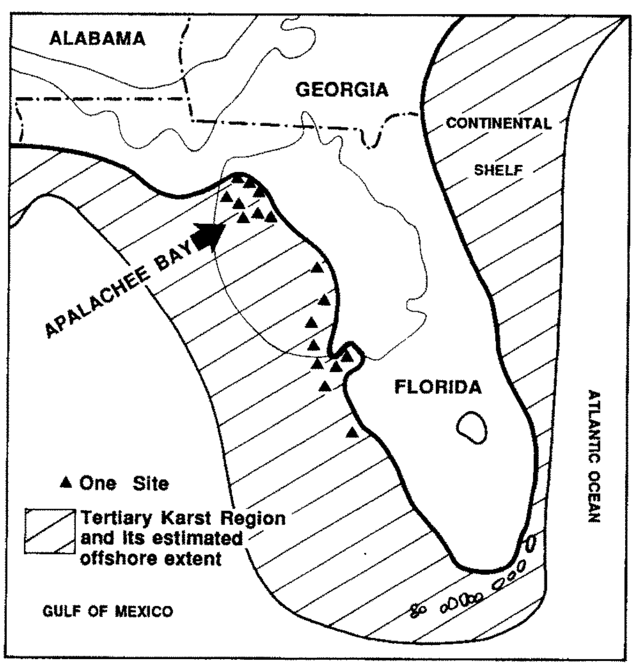


FIGURE 1. Prehistoric inundated sites.

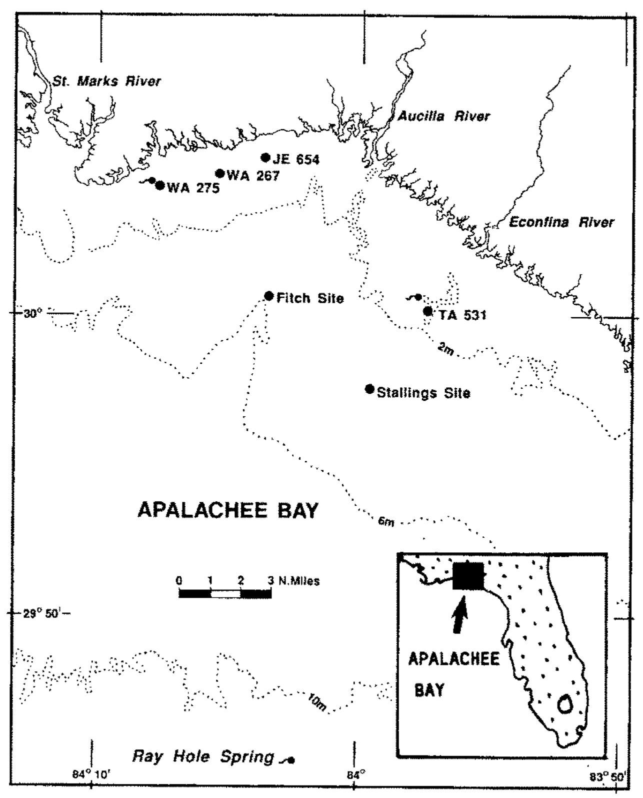


FIGURE 2. Inundated sites.

were available and repeated exploitation could be supported. During wet periods when intermittent water sources were both available and wide spread, game herds migrated away from oases locales, and mobile bands of Paleoindian hunters and gathers followed. A semi-sedentary Paleoindian lifeway may have existed in Florida with prolonged occupations around karst rivers and lakes and less frequent periods of high hunter/gatherer mobility (Dunbar 1989).

Supporting this hypothesis, the New Port Richey and Apalachee Bay areas of the Tertiary Karst Region have coastal Paleoindian site clusters because chert-bearing limestones are plentiful and the limestone is highly karstified and open to the floridan aquifer in many places. Accordingly, where the environment, geohydraulic conditions and the abundance of lithic resources were similar in Paleoindian times, similar site distribution patterns should occur both on and offshore from the present coastline. Where these conditions differed, particularly in geohydrology, further offshore and closer to paleo shore lines, site predictability should differ, but the possible occurrence of chert quarries may make the search for sites less difficult.

Apalachee Bay Study Area

The Apalachee Bay region of the Gulf of Mexico was selected for study (Figure 1), and, given the difficulties associated with locating offshore sites particular attention was given to the frequency and predictability of sites on the adjacent coastal plain.

Apalachee Bay is situated in the northern part of the karst shelf. Several spring-fed rivers flow into Apalachee Bay, including the Ochlockonee, St. Marks, Pinhook, Aucilla, Econfina and Steinhatchee (Figure 2). Only the Ochlockonee River, which displays many non-karst characteristics, carries a particulate sediment load and yields evidence of appreciable erosive potential. From the St. Marks River eastward, other river systems flow through karst terrain where the potential for erosive currents is diminished due to the in-bank storage capability of cavernous limerock (Williams et al. 1977). Karst rivers tend to lose water underground during flood stage but discharge groundwater during low river stage from associated sinkholes and spring caves. As a result, currents are not as erosive, and the potential for downstream transport is greatly reduced. Geologic features associated with most rivers, such as deltas and point bars, are absent in karst rivers flowing through the Tertiary Karst Region of Florida (Vernon 1951).

In terms of archaeological significance, the chances of locating inundated archaeological sites with stratigraphic integrity are much greater in karst rivers because erosion is less likely to have affected them. In terms of the potential depth of burial, most of the areas adjacent to and in Apalachee Bay (the karst plain areas) are covered by only a few meters of sediment over the bedrock. In contrast, deep depressions in the limerock, both isolated sinkholes (as well as other solution features) and those located in river channels, once acted as localized sediment traps and accumulated stratigraphic columns several meters thick. Finally, sites in the karst plain typically do not have bone or other organic preservation, but proof of past human activity is evident in the preserved stone tools and knapping debitage. Inundated sites located in karst sinkholes generally have good-to-excellent preservation of organic and inorganic artifacts in highly stratified deposits (Dunbar et al. 1989).

The marine environment in Apalachee Bay is also non-erosive, being located in a low or zero energy zone, which explains the absence of beaches and barrier islands that are normally associated with areas of high wave action, long shore currents and ample sediment supplies (Yon 1966). The lack of a high energy marine environment in the bay has helped to preserve former terrestrial features formed prior to inundation by the sea. Channels of the Aucilla, Econfina and other karst rivers have not been back-filled and meander over what is now the ocean floor. Offshore springs, some flowing, have related runs that merge with these ancient river beds. Offshore sinkholes are also present and potentially contain sediment sequences which preserve a record of cultural and environmental history. Archaeological evidence that a sinkhole or other sediment-filled depression may contain artifacts, can be determined by inspection of the sediment-starved area surrounding the sinkhole.

Both east and west of Apalachee Bay the potential for site discovery seems less likely. West of the Bay, offshore surface karst gives way and becomes buried by sediments from the non-karst Apalachicola River. Parts of the paleo-channel of the Apalachicola have been traced offshore, but, unlike the karst channels in the bay, offshore segments of the Apalachicola River have been back-filled (Donoghue 1988), therefore sites are more likely to be difficult to access and locate. Both east and west of Apalachee Bay chert resources are either absent or uncommon along the coastal margin and site frequencies decrease due to the absence of quarries and other lithic reduction sites.

Therefore, because high concentrations of sites, including Paleoindian, occur along the Apalachee Bay coastline and because thin sediment cover allows easy access to them, the conditions required to complete a successful underwater survey were considered excellent.

The Aucilla Area as a Model to Locate Sites

The Aucilla is an entrenched river that flows majestically between densely wooded limestone banks as it meanders southward to Apalachee Bay. The age of the Aucilla is uncertain, however, one of its fossil sites suggests a Sangamon interglacial age. The river was formed by the chemical solution of limestone and the processes of karstification, and a considerable amount of its course is underground. Although no major studies of its geologic history have been attempted, little imagination is needed to conclude the river was formerly subterranean and over time has been emerging as a surface river. As a result, the Aucilla and other similar rivers represent the most dominant topographic features in the otherwise flat karst plain of the coastal lowlands.

Many areas of the present channel are not integrated, and unusual features such as dry channels, caves and sinkholes leading to the subterranean river, and isolated channel segments that flow from one underground drain to another are common. During the last ice age, surface channels were similar but not as developed. In areas of the river that are largely underground, occasional sinkholes betray the underground channel and represent the beginnings of the process of surface emergence. At least some of the river's former underground course gives evidence of emerging during the Holocene. At the Page/Ladson site, for example, a land-bridge separating surface channels collapsed, and a new and much longer surface channel was formed about 4,000 years before the present time.

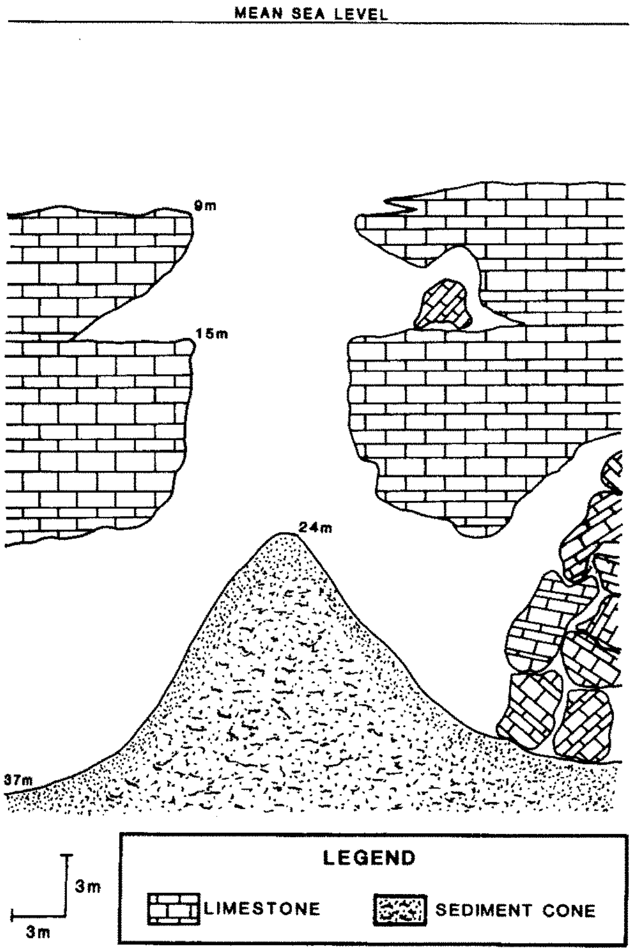


FIGURE 3. Port Paradise Spring.

The Aucilla River and in particular one of its land-locked segments, Half Mile Rise, have been the subject of on-going research on inundated prehistoric sites located along its channel bottom. The Half Mile Rise Project has included several phases, including site surveys on land and underwater, random and controlled underwater surface collections from eroded sites, and one formal excavation at a site known as the Page/Ladson Site. The locations of a majority of recorded inundated sites vary from about 2 m to 10 m below sea level even though the sites are located several kilometers inland from the Gulf of Mexico. This research has allowed a degree of accuracy regarding regional site predictability.

A steadily increasing body of evidence from Half Mile Rise supports the Oasis hypothesis and provides an intriguing picture of Pleistocene/Holocene environments for the Apalachee Bay area. Deep areas, primarily sinkholes, in the Aucilla River were once shallow ponds or swamps forests in the otherwise dry river channel. Naturally modified bone of late Pleistocene animals from the Page/Ladson site indicates animals entered the sink, probably for water, from about 15,000 to 10,500 years ago. Artifacts of ivory and stone suggest Paleoindians hunted around and in the sinkhole. The sinkhole could have also provided a stable source of drinking water for Paleoindian inhabitants. Subsequent human activity, about 10,000 years ago, indicates a peak of human activity at the site including hunting, wood working and base camp occupation. Stone tools are the most common type of artifact recovered, but bone tools and carved wood have also been found in the highly stratified and thick deposits in the sinkhole.

Lithic resources were also needed by early Indian populations, and the distribution of chert for tool making did not always occur at sinkhole localities. Geologically, the chert-bearing limestone surrounding the Aucilla River comprises a slightly undulating karst plain sculpted by higher sea level stands but extensively concealed by thin clastic sediments, predominantly sand. Erosion-resistant chert outcrops are an exception and protrude above the ground's surface. The distribution of chert in the karst plain and in the Aucilla river basin is random but frequent.

Chert boulders are exposed when the limestone surrounding them dissolves (karstification) and leaves behind pinnacles of erosion- resistant rock. Presently, about 100 chert outcrops are known in the area and occur in two types of settings. First and most common are chert outcrops (boulder fields) in the karst plain. The second and more exposed type of outcrops are located in river channels. Most often, river channel chert outcrops form rapids or rocky shallows, but some locations are 5 m or more deep. All of the known underwater chert outcrops in the Aucilla River and its tributary, the Wacissa River, have been identified as quarry sites and demonstrate the river channels were once dry. Underwater quarry sites represent the most conspicuous, therefore easy to find, inundated site type, because artifact counts (lithic debitage) are very high and chert outcrops represent visible surface features.

Thus site concentrations in the Aucilla River area occur adjacent to and in karst depressions, primarily around sinkhole clusters in river bottoms or other areas where many sinkholes occur together. Smaller, and what are believed to be sporadically used sites, occur around isolated sinks and in locations away from areas of abundant karst features. Chert quarries are an exception, and are located around the river, as well as scattered throughout the surrounding karst plain.

The Offshore Survey in Apalachee Bay

The search for offshore sites becomes much easier when inundated sinkholes, river channels and chert rock outcrops can be used as convenient guideposts. The irregular topography associated with features such as submarine sinkholes (Figure 3; also see Serbousek 1988) attracts fish and other marine life, which in turn has attracted fishermen and sport divers. Thus, many potential sites have already been located and, like the inland Aucilla River project, the results of survey work conducted in Apalachee Bay would not have been as successful without the assistance of volunteer divers familiar with the area being surveyed. In Apalachee Bay, not many topographic targets have been inspected, but several sites are associated with the locales that have been inspected. There are many targets to survey in Apalachee Bay, potentially hundreds, and several should have associated cultural remains.

The assistance of fishermen and sport divers was important to the success of the project, because they provided Loran C coordinates for several targets, and, in a few cases, provided the locations of sites known to contain artifacts. Near-shore surveys (inside the state's 16 km limit) conducted by Faught and Dunbar located six archaeological sites (Figure 2) from 1 km to 10 km offshore at depths ranging from 0.5 m to 5.5 m

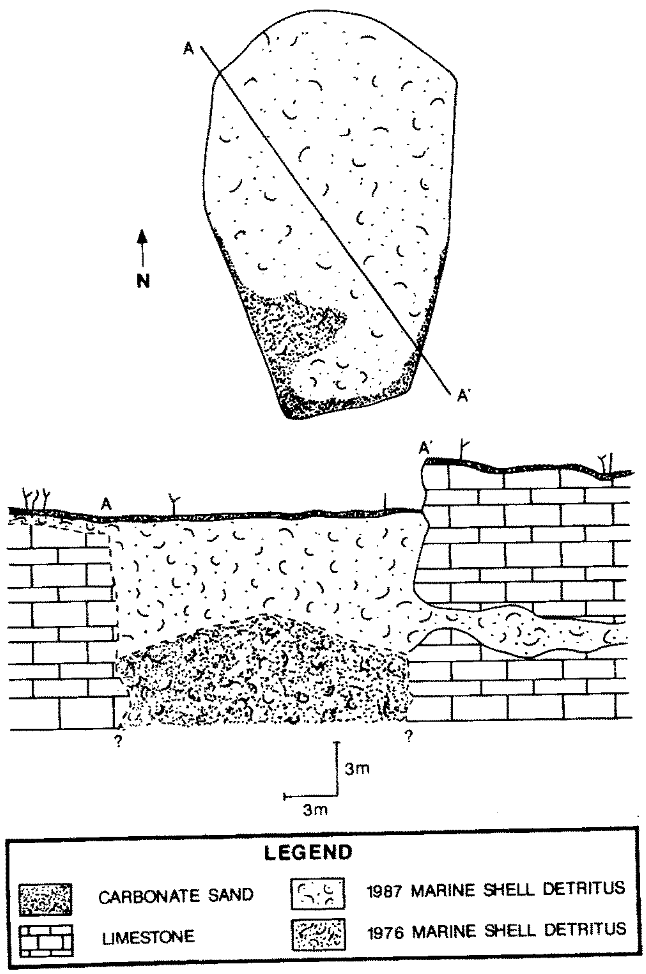


FIGURE 4. Ray Hole Spring.

below sea level. One brief survey conducted beyond the state territorial limit by Anuskiewicz, Stright, Garrison, and Dunbar succeeded in gathering samples from a possible archaeological site, Ray Hole spring, located some 32 km offshore in 12 m of water.

The first offshore survey work took place in 1986 and involved volunteers from the avocational archaeological group, the Paleontological and Archaeological Research Team (PART) of Florida, Mike Faught from the University of Arizona, and the principal author representing the Florida Bureau of Archaeological Research. One flowing and another non-flowing offshore spring, a segment of river channel, and several rock outcrops were inspected. One chert outcrop is located in the channel of the Econfina river, an area that would have been a rocky shallows prior to sea level transgression over the site. In three days four archaeological sites were located and, similar to the inland areas, 100% of the chert outcrops were determined to be quarry sites (Figure 2). The Econfina River Channel site appeared to be the most promising because two sediment-filled sinkholes were believed to be located adjacent to the site. However, during this first survey, we had neither excavation equipment nor other means to determine sediment thickness. All "excavation" was limited to hand fanning (Faught 1988).

Later, in the fall of 1986, another expedition was undertaken, and this time the target for investigation was Ray Hole Springs. This project was funded by the US Interior Department's New Orleans Branch of the Minerals Management Service (MMS), and was supported by the Florida Bureau of Archaeological Research and the Academic Dive Program and Marine Laboratory of Florida State University (Anuskiewicz 1988). Thanks to a member of PART, Loran C coordinates were obtained and the former spring was easily located. Ray Hole Springs cave was plugged with sediments when we visited (Figure 4), but several years earlier it had been reported open with an occasional flow (Rosenau et al. 1977). The limestone, minor amounts of which had been silicified, outcrops along the rim of the sinkhole and in the collapse zone around the rim. Exposed rock, including limestone, chert and what appeared to be dolomitized limestone, was pitted by organisms capable of dissolving and implanting themselves into the rock.

Armed with one 10 cm induction dredge, several small test excavations were conducted, mostly around the sinkhole's rim. Several flake-like objects of chert were recovered; however, to call them artifacts would be premature due to their degraded condition caused by the marine environment. Thus, from a conservative stance, the flake-like objects are of probable cultural origin. The flake-like objects were recovered from marine sediments, an indication that they had been displaced from unknown context (Figure 5).

The most interesting discovery at Ray Hole Springs was, of course, found during the last dive, excavating the last test pit, with time running out and the weather turning bad. A stratigraphic sequence of marine sediment resting above a level dominated by oyster shell was encountered. A large chunk of live oak wood was sandwiched between the oyster shell and limestone bedrock. Because the live oak wood had not been damaged by marine or brackish water organisms (teredo worm, etc.) it was thought to have been deposited in a wet but probably fresh water environment. Live oak wood is suggestive of a coastal hammock where salt water intrusion would not likely occur. The oyster shell level is indicative of a brackish water environment where saltwater becomes diluted by the influx of freshwater adjacent to the coast, and certain species, notably oysters, flourish. Bioclastic debris, sand, chunks of rock and an occasional "flake" made up the top level of marine sediment, a sediment type that continues to form, although slowly, as the shells of marine animals are broken up and added to the otherwise sparse soils above bedrock. In general, the marine conditions at Ray Hole Spring reflect a higher energy environment compared to similar conditions closer to shore and more protected by Apalachee Bay.

Carbon dates run on samples of wood and shell suggest that the marine transgressive interpretation of the Ray Hole Springs sediments is correct, with the oldest sample occurring below the younger. The Carbon date on the oak wood yielded an age of 8,220 +/- 80 years B.P. and the oyster shell 7,390 +/- 60 years B.P. (C-13 adjusted 7,740 +/- 60 years B.P.). Thus, if this interpretation holds true, a brackish water coastal environment had replaced terrestrial/freshwater habitats by about 7,500 years ago.

In our latest offshore expedition, in July of 1988, Mike Faught returned with a small grant to continue work on the Econfina Channel Site. The project was supported by The Florida Bureau of Archaeological Research, the Florida Museum of Natural History, the Geology Department at Florida State University and volunteer help and equipment from the avocational archaeological group PART of Florida and the Marine Archaeological Divers Association (MADA). This project focused research activities on the Econfina Channel site, although one day was set aside to survey new targets.

Excavations using a 10 cm induction dredge and sampling using a 7.5 cm vibracore were planned but the two suspected sediment-filled sinkholes were rock bottomed; therefore coring did not take place. Several test pits were conducted and most produced chert debitage and an occasional stone tool. The most informative test pit was placed on the former bank of the river rather than in the channel. Excavation reached about 1.65 m before bedrock was encountered. The top few centimeters of sediment were of marine origin and were followed by 15 cm to 20 cm of partially articulated oyster shell. The articulated oyster shell stratum seems to represent an extinct oyster bar that existed when the water was less salty and probably near the fresh water influx of the mouth of the Econfina River. As sea level rose, the river and coastline migrated north, leaving behind a dead oyster bar, stranded in water too salty for survival.

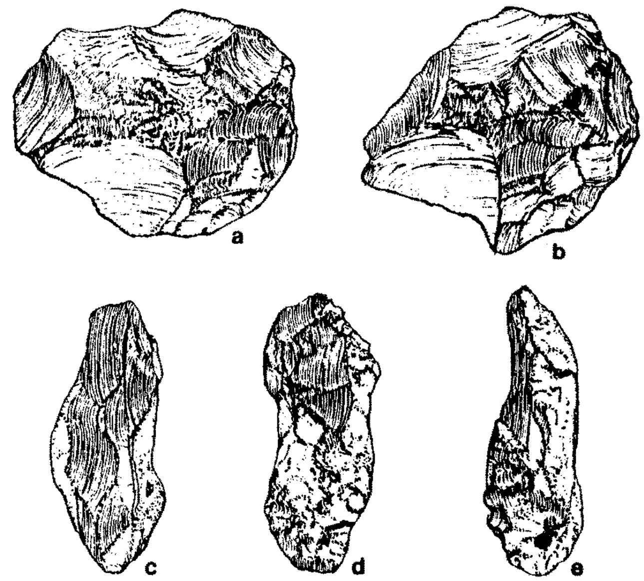
A mixture of disarticulated oyster and other brackish water shells containing abundant chert debitage and tools (Figure 5) was encountered below the level of articulated oyster shell. The base of an archaic projectile point was also recovered. About 20 cm above the limestone bedrock waterlogged tree roots appeared and become more numerous with depth.

A tree root sample recovered from the Econfina Channel site in 1986 was identified as cypress and carbon dated to 5,160 +/- 100 years before present. This date agrees with the stemmed archaic projectile point recovered from the site and suggests the site was near the coast when Archaic Indians utilized the area. Thus an archaeological site now located some 5 km offshore was once on the edge of a freshwater river near the coastline of the Gulf of Mexico. In Archaic times water surrounding the site was brackish and provided coastal resources including shell fish. Chert resources were also in the shallow waters and tidal flats around the site and provided the raw material for lithic tool production.

The one day spent randomly surveying topographic targets was successful, and two new sites were discovered 10 km offshore. Two chert outcrops produced evidence of quarry activity. The most interesting site, the Fitch Site (Figure 2), appears to be a massive quarry, producing, among other artifacts, conical cores suggestive of the late Paleoindian or Early Archaic time-frame.

Paleoindian Sites Along Paleo Shore Lines

Ray Hole Springs and similar offshore sinkholes and springs potentially offer an opportunity to accurately determine absolute sea level stands at different elevations below present sea level. Sinkholes now located in the Gulf of Mexico which had formed prior to or during the late Pleistocene, when the shelf was terrestrial, would have acted as excellent sediment traps similar to the Page/Ladson site in the Aucilla river. Offshore sinkholes should contain a dateable and uninterrupted stratigraphic sequence, protected from transgression and potentially capable of providing absolute sea level curves for the Eastern Gulf of Mexico. Any research for offshore archaeological sites aimed at resource management planning should include plans to establishment of the absolute sea level curve as a necessary step toward site predictability. This could be accomplished by coring sinkholes that occur at different depths below sea level.



FIRGURE 5. a, b, c from the Econofina River Channel Site; d, e from Ray Hole Spring.

The offshore sites recorded in this survey occur in similar topographical settings. The offshore sites that have been investigated are located in water depths shallower than or equal to the depth of the inland Page/Ladson site. Site predictability based on land-based modeling, however, will not be constant because different geohydraulic conditions existed near paleo shore lines of the Tertiary karst shelf.

Formerly inland Paleoindian sites like Page/Ladson would have been hundreds of kilometers from and many meters above the contemporary sea level of the time. Likewise, locations now submerged in the Gulf of Mexico, such as Ray Hole Springs, would have also been inland and well above sea level. From about 12,000 to 10,500 years ago, Ray Hole Springs is believed to have been elevated high enough above contemporary sea levels to have been within an area of inland depressed water tables similar to, but perhaps not as dramatic as, conditions at the Page/Ladson site. However, the correlation of former inland sites to former coastal sites is not possible due to differences in the water table's proximity to the surface and resulting availability of potable surface water. In Florida, because of its geohydraulic history during the Pleistocene, limited surface water decreased settlement options and site distributions were restricted (Dunbar 1989). Closer to the paleo shore lines, surface water would have been more abundant and sites may have been more dispersed.

Assuming the Tertiary karst shelf extends to the depth of the Clovis-age shore line, predictive modeling of sites along that shore line, with dramatically different geohydraulic conditions and little comparative site information, becomes more difficult. However, certain thoughts approaching such an attempt are worth considering and field testing.

First and most important, what was the geohydraulic condition of the floridan aquifer near the late Pleistocene coast line? Was the aquifer static with little discharge and, as a result, contaminated by salt water intrusion into its exposed coastal margins, or did the aquifer discharge large quantities of fresh water along coastal marshes? A contaminated aquifer insinuates plentiful surface water but scarce potable sources, saltwater coastal habitats, and conditions not favorable for extensive coastal occupation. An aquifer discharging fresh water, insinuates plentiful drinking water, brackish water coastal habitats and wide-spread settlement options.

It seems most likely that the floridan aquifer discharged fresh water along the coastal strand, particularly after about 15,000 years ago, when the severe aridity of the glacial maximum gave way to climatic moderation in North Florida (Watts 1983). Paleo environmental data should be retrievable from organic sinkhole sediments to determine what type(s) of coastal habitats existed along paleo shore lines.

Secondly, it has been well documented in Florida and elsewhere in the Southeastern United States that regions containing chert or flint often contain numerous Paleoindian sites. The formerly inland areas around the Aucilla River support this contention because higher numbers of sites occur along its karst channel where chert is abundant, compared to karst channels like Crystal River, where chert outcrops are less numerous, as are Paleoindian sites. Because site locations near paleo shore lines are likely to be more widespread, they should also be more difficult to locate. Chert quarry sites are exceptions in areas where the shelf is sediment-starved, because outcrops protrude above the seabed and provide good visual and remote sensing targets. If chert-bearing limestones are not buried and extend to the Clovis-age shore line in the Gulf of Mexico, the chances of finding a site so deep and so far offshore should greatly increase. Assuming a chert quarry can be located, then the search for related hunting, gathering and habitation sites should be expedited.

Several Tertiary limestone formations on land contain chert nodules, but only two contain abundant quantities throughout their outcrop areas. The Suwannee Limestone of Oligocene age and St. Marks Formation of early Miocene age contain more silica impurities than other exposed Tertiary limestones (Bishop 1961, Cooke 1945; Carr & Alverson 1959). Eocene limestones are known for their almost pure calcium carbonate content and are believed to have been locally silicified in areas where the mid-Miocene age Hawthorne Formation was able to supply dissolved silica gel in order for silification to take place (Willams et al. 1977). The Hawthorne Formation is absent along the present coastline of the Tertiary Karst Region where the Eocene limestones contain few chert nodules. Conversely, the St. Marks and Suwannee limestones contain abundant chert near the coast and, as a result of the survey work reported here, outcrop/quarry areas associated with these limestones have been located offshore. Therefore the probability of locating chert outcrops offshore seems most likely where the Suwannee and St. Marks limestones outcrop on the ocean's floor.

Conclusions

The sediment-starved karst shelf offers researchers a rare opportunity to easily access potential site locations, visually identify site remains, and test the sites with a minimal amount of effort and equipment. Continued research on the karst shelf promises to yield a calibration point for site predictability in the eastern Gulf. To date, the research objectives and work carried out in Apalachee Bay have been simple and mostly aimed at demonstrating that archaeological sites exist, are fairly abundant and can be located by using the site distribution model for inland prehistoric sites. Remote sensing equipment has, so far, not been available, but fishermen and sport divers have been very productive guides during the offshore search.

A properly funded project should include an initial attempt to establish paleo shore lines and absolute sea level curves for the eastern Gulf. The analysis potentials of cores from offshore sinkholes, not only promise to provide information on absolute sea level curves, but also information about the environments and geohydraulic history of the continental shelf. Although the histories of geohydraulic change, environmental evolution and sea level transgression do not directly address archaeology, they are critical factors to understand, if we are to make sense of Paleoindian site predictability on the eastern continental shelf. The distribution of coastal Paleoindian sites will probably differ from the known pattern of interior sites, but chert outcrops, if they exist, should make the search less difficult. If chert outcrops are located along the paleo shore line and some outcrops are quarries, associated activity and occupation sites should be in the vicinity. Finally, a determination of the scientific importance, primarily the stratigraphic integrity, of sites located in various offshore settings (in sinkholes, the karst plain, or around former coastal features etc.) is needed, along with an attempt to determine if sites, as opposed to physiographic features, can be detected by remote sensing equipment.

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JAMES S. DUNBAR
BUREAU OF ARCHAEOLOGICAL RESEARCH
THE CAPITOL
TALLAHASSEE, FLORIDA 32399-0250

LAWRENCE E. ATEN

The Past and Future of OCS Cultural Resources Management

Introduction

It is important, from time to time, to review what we are interested in and to consider where we are going with the submerged archaeology of the outer continental shelf (OCS) rather than to take these matters for granted. Working on the OCS is a fragile opportunity. We must continue to expect that important information and sites exist to be protected on the continental shelf, and we must have minimally adequate techniques to work in that setting, if we are to justify the public policy protections that have been established.

So, for this discussion, and without wasting time revisiting old controversies, Ed Friedman asked me to briefly cast an eye over how far Federal OCS cultural resources activity has come and where it might go in the foreseeable future.

Not many years ago it was common to read that littoral and maritime economies were a Mesolithic and Middle Archaic innovation in human history. As we now know, evidence of coastal economies extends far back into the Paleolithic in the Old World (see Clark 1983:2 for summary), and New World coastal dates are steadily creeping farther back in time, now solidly into the Early Archaic and with some highly suggestive evidence of